VMU045005EC9xxB

450mA CONSTANT CURRENT LED DC MODULES, 5" LINEAR

- For use in UL Class 2 lighting systems
- Constant current for maximum efficacy
- On-board connector for ease of assembly
- High lumen, high efficacy
- Suitable for DLC applications: L70>60,000hrs / L90=40,000hrs
- Meets UL8750 recognized
- RoHS compliant
- 90 CRI standard

General Specifications

	Min.	Typical	Max.
Input Voltage ①	10.5VDC	11.5VDC	11.7VDC
Input Current ①	50mA	350mA	450mA
Input Power ①	0.5W	4.0W	5.3W
Initial Lumens @4000K / 90CRI	89 lumens	605 lumens	762 lumens
Initial Efficacy @4000K / 90CRI	170 lm/W	150 lm/W	144 lm/W

Beam Angle	120°
CRI	90CRI standard
Storage Temperature Range	-40°C to 100°C / -40°F to 212°F
Operating Temperature Range (ta)	-40°C to 45°C / -40°F to 113°F
Maximum Case Temperature (Tc)	L70: Tc max 105°C / L90: Tc max 105°C
Estimated Lumen Maintenance ②	L70: >60,000Hrs / L90: =40,000Hrs
Color Consistency	Binning per ANSI C78.377-2015 @ 25°C; 3 SDCM Typ. 5SDCM max.
Overall Size	5” L x 0.71” W x 0.22” H (126.97mm x 18.09mm x 5.6mm)
PCB Material / Thermal Conductivity	FR-4 / 0.3W/mK
LED Quantity	12pcs.
Module Weight	8g / 0.018lb
PCB Part Number	VMU045005ECXXXB
Maximum Screw Installation Torque	25 inch - ounces
Connector Type	BJB #46.131.1001.50 (single pin connector)
Packaging: Master Carton	100pcs
Thermal Feedback	Not Available
Safety/Compliance	cURus (File # E351548)
	Suitable for UL Class 2 Lighting Systems
	RoHS Compliant
	Dry and Damp Location
Energy Efficiency Label (EEI-Label)	A++
Warranty	5 years @ Max. Tc from the date of manufacture

①Nominal ratings. Performance based on Tc mod = 25° C. See thermal de-rating chart (pg. 3) for higher temperature operation
②TM-21 Reported Numbers

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Electrical and Optical Specifications

LED Module Part Number	Number of LED	Input Current	Nom. Forward Voltage	Nom. Rated Power	Max. Fwd. Voltage	Max. Rated Power	Nom. Lum. Flux @4000K/90 CRI	Nom. Efficacy @4000K/90 CRI
VMU045005EC9xxB	12	50 mA	10.5 V	0.5 W	12 V	1 W	89 lm	170 lm/W
		75 mA	10.6 V	0.8 W	12 V	1 W	135 lm	170 lm/W
		100 mA	10.8 V	1.1 W	12 V	1 W	181 lm	168 lm/W
		125 mA	10.8 V	1.4 W	12 V	2 W	225 lm	166 lm/W
		150 mA	10.9 V	1.6 W	12 V	2 W	270 lm	164 lm/W
		175 mA	11.0 V	1.9 W	12 V	2 W	313 lm	162 lm/W
		200 mA	11.1 V	2.2 W	12 V	2 W	356 lm	161 lm/W
		225 mA	11.2 V	2.5 W	12 V	3 W	399 lm	159 lm/W
		250 mA	11.2 V	2.8 W	12 V	3 W	441 lm	157 lm/W
		275 mA	11.3 V	3.1 W	12 V	3 W	483 lm	155 lm/W
		300 mA	11.4 V	3.4 W	13 V	4 W	524 lm	153 lm/W
		325 mA	11.4 V	3.7 W	13 V	4 W	565 lm	152 lm/W
		350 mA	11.5 V	4.0 W	13 V	5 W	605 lm	150 lm/W
		375 mA	11.6 V	4.3 W	13 V	5 W	645 lm	149 lm/W
		400 mA	11.6 V	4.7 W	13 V	5 W	684 lm	147 lm/W
		425 mA	11.7 V	5.0 W	13 V	6 W	723 lm	145 lm/W
		450 mA*	11.7 V	5.3 W	13 V	6 W	762 lm	144 lm/W

Luminous Flux De-Rating: CCT and CRI Multipliers

	2700K	3000K	3500K	4000K	5000K	5700K	6500K
CRI 80(R9> 0)	1.08	1.11	1.12	1.16	1.17	1.17	1.16
CRI 90(R9>50)	0.90	0.93	0.95	1.00	1.01	1.00	1.00

NOTES:

1) Performance based on Tc mod = 25°C. See thermal de-rating chart (pg. 3) for higher temperature operation
2) Standard lumen output and efficacy is calculated for standard options. Reference CCT & CRI vs Luminous Flux chart for lumen ratio calculation.
3) Specifications are subject to change without notice.
4) The LED DC Module can be configure with different LED chip quantities, series and parallel design configurations to meet a specific design requirement. Contact Fulham for further assistance.
5) * Indicates minimum and maximum rated voltage. Modules may be operated at a voltage within this range, below the Tc rating.
6) 70CRI is NOT available.

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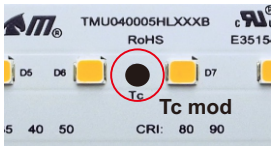
Thermal Specifications

	Eco series DC Modules
Storage Temperature Range	-40 to 100°C / -40 to 212°F
Operating Ambient Temperature Range (ta)	-40 to 45°C / -40 to 113°F
Maximum Case Temperature (Tc)	L70 = 105°C(221°F) / L90 = 105°C(221°F)



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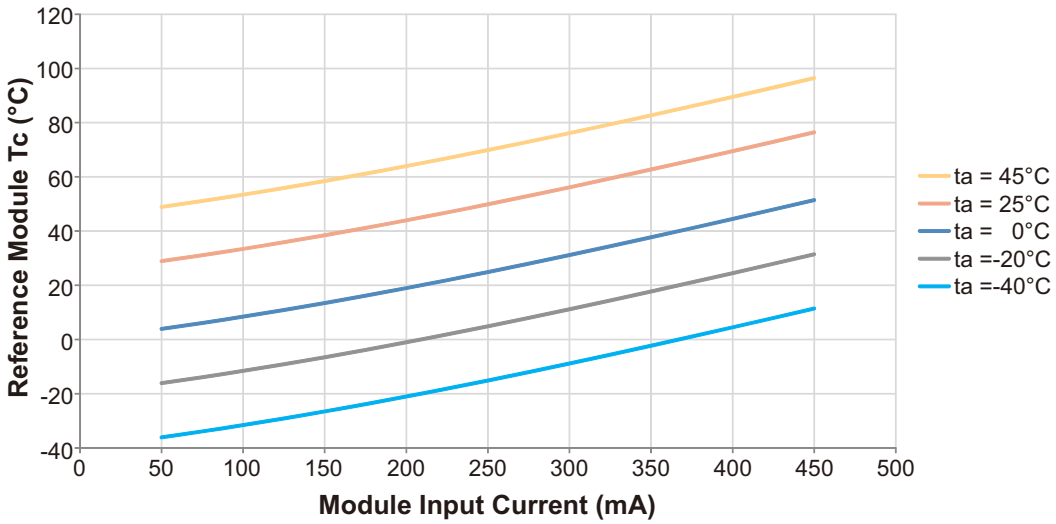
Thermal De-Rating

Module Tc vs. Luminous Flux vs. Forward Voltage

Module Case Temperature (Tc)	Total Vf Multiplier	Luminous Flux Multiplier
25ºC	1.000	1.000
30ºC	0.998	0.992
35ºC	0.997	0.983
40ºC	0.995	0.975
45ºC	0.993	0.966
50ºC	0.992	0.958
55ºC	0.990	0.949
60ºC	0.988	0.941
65ºC	0.986	0.932
70ºC	0.985	0.924
75ºC	0.983	0.915
80ºC	0.981	0.907
85ºC	0.980	0.899
90ºC	0.978	0.890
95ºC	0.976	0.882
100ºC	0.975	0.873
105ºC	0.973	0.865

Module Tc vs. Ambient (ta) vs. Module Input Current (mA)



NOTES:

1) Chart "Module Tc vs. Ambient (ta) vs. Module Input Current (mA)" for referance only in an open ambient. The performance within a luminaire will vary depending on the size and material of luminaire.

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Certification Chart

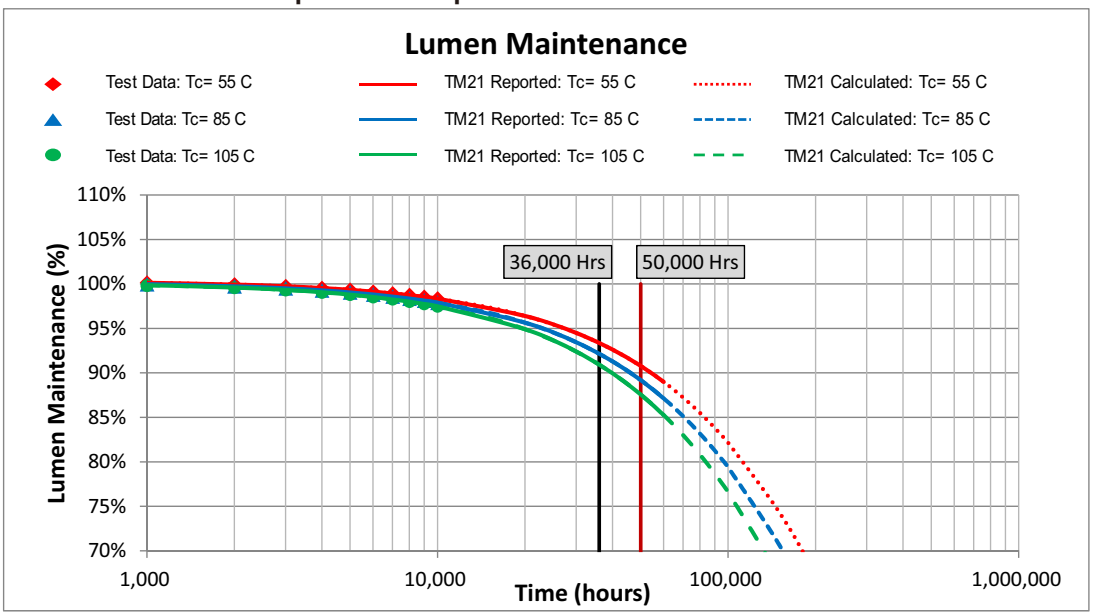
Model / Classification	VMU045005EC9XXB
RoHS COMPLIANT	YES
cULus	YES
Energy Efficiency Label (EEI-Label)	A++
Class 2 Lighting System	YES

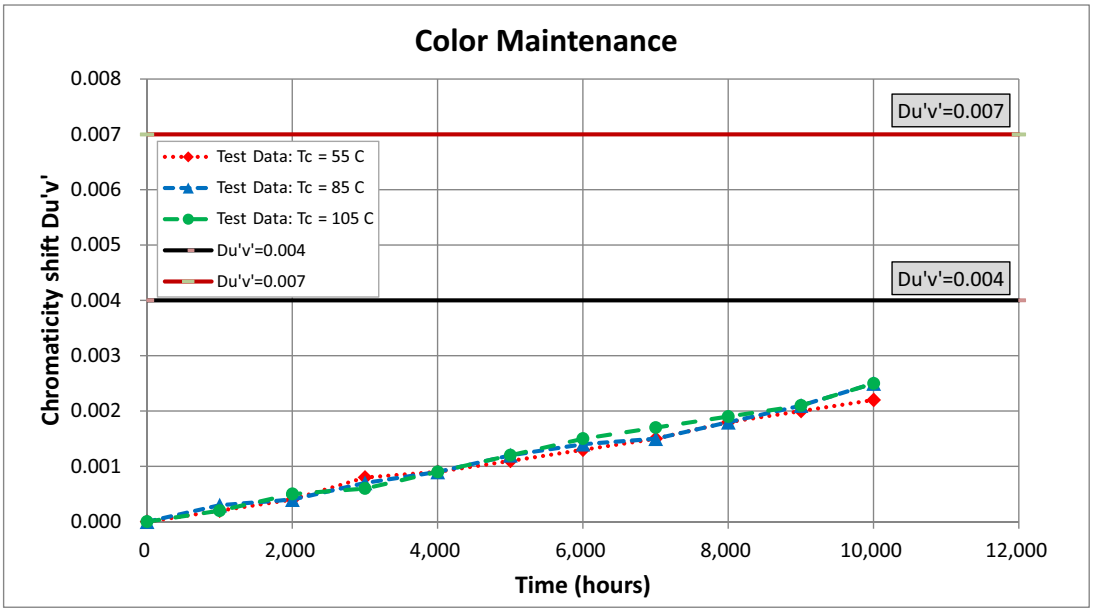
Energy Star™ TM-21 Calculator Data

Tc Module	Reported L70	Reported L90
55°C	>60,000 Hrs	54,000 Hrs
85°C	>60,000 Hrs	46,000 Hrs
105°C	>60,000 Hrs	40,000 Hrs

Tc Module	Calculated L70	Calculated L90
55°C	180,000 Hrs	54,000 Hrs
85°C	154,000 Hrs	46,000 Hrs
105°C	133,000 Hrs	40,000 Hrs

LED Lumen & Color Maintenance Data per LM-80 report and TM-21 Calculator





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Mechanical Drawings

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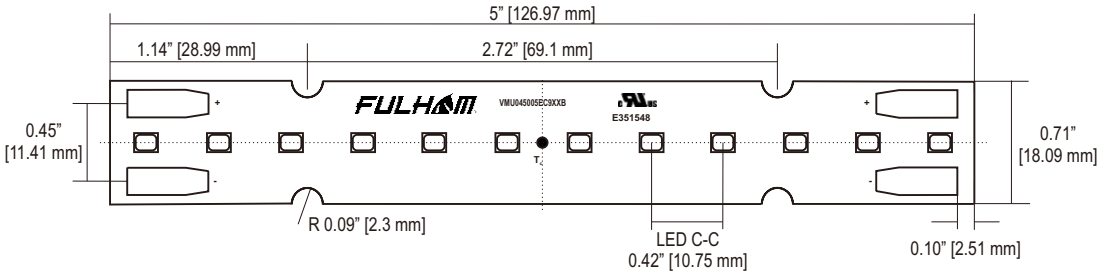
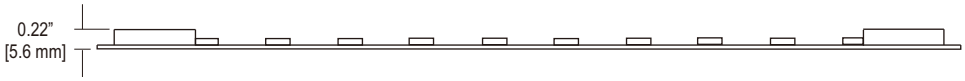
Overall Dimensions	
Length	5” [126.97mm]
Width	0.71” [18.09mm]
Height	0.22” [5.6mm]

Top View



Side View



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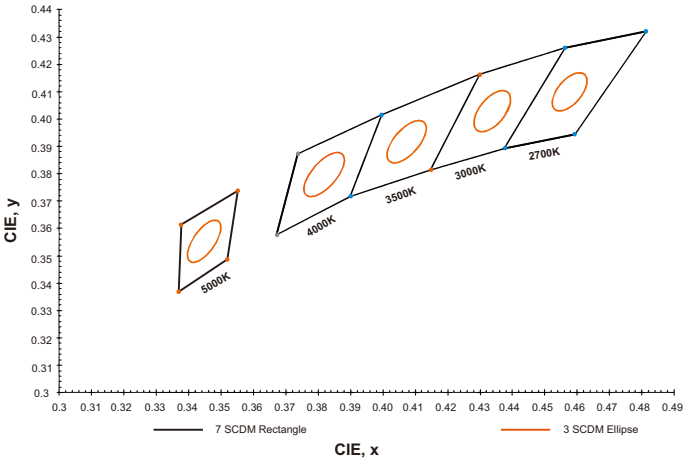
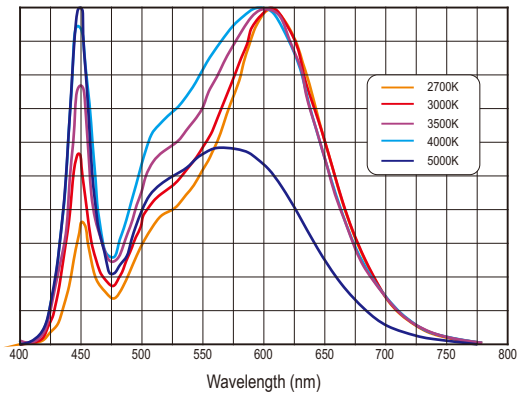
Color and Binning



Optical Spectrum



Compatible Fulham Drivers

(Please use the links below for a complete list of compatible Fulham drivers and wiring diagrams)

- Eco Series System Combination:
- Fulham's Wiring Diagrams: https://cdn.fulham.com/PDFs/SpecSheets/DC-Modules-Wiring-Diagrams.pdf
- Compatible with Fulham Hotspot EM Systems.

NOTES:

1) The Color and Binning and Optical Spectrum charts are for reference only. For more detailed info, contact factory.
2) Reference Samsung Chromaticity Diagram for Color and Binning. Binning per ANSI C78.377-2015 @ 25°C; 3 SDCM.
3) The Optical Spectrum values vary depending on product type and color rank.
4) Driver not included.

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Guidelines

Termination Notes

- Connector Type: BJB Single Pole SMD Terminal Block, Part #: 46.131.1001.50
- URus Rating: 9A/300V; cUR Rating: 3A/300V
- Use solid wire size 24 – 18 AWG, rated at a minimum 50V, minimum 105°C, and stripped to length 8 mm (0.31 inches).
- To release wire, twist and pull the wire simultaneously.

Optional Accessories - Interconnect Pins

- Single Interconnect Pin: Wago Part Number 2060-951
  Metal pin(s) to interconnect LED modules that are compatible with connector.
  For more detail information, please visit Wago's website: http://www.wago.com/infomaterial/pdf/60291132.pdf

Fastening Notes

- If fastening by screw hole, use any screw with diameter less than 0.185 in (4.7mm). Use all available screw holes to ensure good contact between back side of module and mounting surface. Refer to max specified torque for installation. Suggested screw sizes: #6 or M4 Pan Head screw.
- If fastening using double-sided tape, start with clean, oil-free and dust-free surface. Peel backing and place LED module on mounting surface. Firmly press down on the module to ensure good adherence. Follow the double-side tape manufacturer's installation instructions.
- BJB P2F (Push-to-Fix) fixing elements for PCBs can be used to fasten LED modules to mounting surface.
  Reference BJB's website for ordering information and specific model to use:
  http://www.bjb.com/index.php?pid=376706&lid=10.

Environmental Rating

- LED DC Modules are rated for dry locations.

Electrostatic Sensitive Product (ESD)

- Fulham LED products should be handled with proper measures to protect against any potential ESD damage.
- When servicing, personnel should be ground and direct contact with LED should be avoided.

Thermal Management

- Proper thermal management should be employed to ensure life and reliability of product. Max Tc of module should not be exceeded.
- Use of thermal grease, paste, pad, or other material interface is highly recommended.

Polarity Notes

- LED DC Modules are polarity sensitive.
- Ensure that "positive" from LED Driver is connected to "positive" of LED modules and that "negative" from LED Driver is connected to "negative" of LED modules.
- Polarities of modules are marked with "+" for positive and "-" for negative.

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Part Number Matrix

V M U 045 005 EC 9 XX B

Product Line	Type	Control Type	Input Current	Typ. Power	Design	CRI	Color Temperature	Option
V = Vizion	**M** = Module (UL Class 2)	**U** = None	**045** = 450mA Max.	**005** = 5W	**EC** = Eco Series	③**9** = 90	**27** = 2700K ③ **30** = 3000K ③ **35** = 3500K ③ **40** = 4000K **50** = 5000K	**B =** 5"

③Standard Product offering (All other options are made to order with MOQ and lead time)

Product Image: Eco DC Module

Top View

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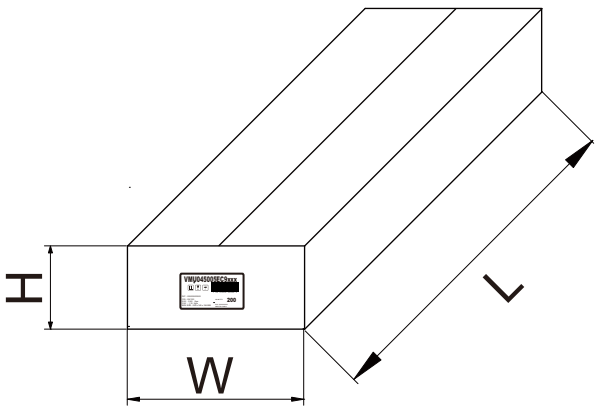
Packaging

Master Carton



OUTER DIMENSION		
L	W	H
6.30”(160mm)	6.69”(170mm)	4.72”(120mm)

Net Weight	Gross Weight	QUANTITY
1.76 lbs. (0.8kg)	2.84 lbs. (1.29kg)	100pc.